**Factoring and Rationals Test Review**

Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

#### Factor Algebraic Expressions

**1.** Factor the following polynomial.

3*x*2 + 7*x*

|  |  |  |
| --- | --- | --- |
|  | **A.** | *x*(3*x* + 7) |

|  |  |  |
| --- | --- | --- |
|  | **B.** | 3*x* + 7 |

|  |  |  |
| --- | --- | --- |
|  | **C.** | *x*2(3*x* + 7) |

|  |  |  |
| --- | --- | --- |
|  | **D.** | 5*x*(3*x* + 25) |

#### Factor Algebraic Expressions

**2.** Factor the polynomial below.

*x*2 + 4*x* + 4

|  |  |  |
| --- | --- | --- |
|  | **A.** | (*x* + 2)2 |

|  |  |  |
| --- | --- | --- |
|  | **B.** | *x*2 + 4 |

|  |  |  |
| --- | --- | --- |
|  | **C.** | 2*x*2 + 4 |

|  |  |  |
| --- | --- | --- |
|  | **D.** | (*x* + 4)2 |

#### Rational Algebraic Expressions

**3.** Simplify the following expression.





|  |  |
| --- | --- |
|  | **A.** |

|  |  |  |
| --- | --- | --- |
|  | **B.** |  |

|  |  |  |
| --- | --- | --- |
|  | **C.** |  |

|  |  |  |
| --- | --- | --- |
|  | **D.** |  |
|  |  |  |
|  |  |  |

Rational Algebraic Expressions

**4.** Simplify the following expression.





|  |  |  |
| --- | --- | --- |
|  | **A.** |  |
|  |  |  |

|  |  |  |
| --- | --- | --- |
|  | **B.** |  |
|  |  |  |

|  |  |  |
| --- | --- | --- |
|  | **C.** |  |
|  |  |  |

|  |  |  |
| --- | --- | --- |
|  | **D.** |  |
|  |  |  |
|  |  |  |

#### Rational Algebraic Expressions

**5.** Simplify the following expression.

|  |  |  |
| --- | --- | --- |
|  | **A.** |  |

|  |  |  |
| --- | --- | --- |
|  | **B.** |  |

|  |  |  |
| --- | --- | --- |
|  | **C.** |  |

|  |  |  |
| --- | --- | --- |
|  | **D.** |  |

#### Factor Algebraic Expressions

**6.** Factor the polynomial below.

**

(x-3)(x-4)

|  |  |
| --- | --- |
|  | **A.**  (x-3)(x+4) |

|  |  |  |
| --- | --- | --- |
|  | **B.** | Prime |

|  |  |
| --- | --- |
|  | **C.**  (x+3)(x-4) |

|  |  |
| --- | --- |
|  | **D.** |

#### Rational Algebraic Expressions

**7.** Simplify the following expression.

|  |  |  |
| --- | --- | --- |
|  | **A.** |  |

|  |  |  |
| --- | --- | --- |
|  | **B.** |  |

|  |  |  |
| --- | --- | --- |
|  | **C.** |  |

|  |  |  |
| --- | --- | --- |
|  | **D.** |  |

#### Factor Algebraic Expressions

**8.** Factor the polynomial below.

*x*2 – 36

|  |  |  |
| --- | --- | --- |
|  | **A.** | (6 + *x*)(6 - *x*) |

|  |  |  |
| --- | --- | --- |
|  | **B.** | (*x* - 6)2 |

|  |  |  |
| --- | --- | --- |
|  | **C.** | (*x* + 6)(*x* - 6) |

|  |  |  |
| --- | --- | --- |
|  | **D.** | (6 - *x*)2 |

#### Factor Algebraic Expressions

**9.** Factor the polynomial completely.

6*x*3 + 36*x*2 - 96*x*

|  |  |  |
| --- | --- | --- |
|  | **A.** | 6(*x*2 - 2)(*x* + 8) |

|  |  |  |
| --- | --- | --- |
|  | **B.** | 6(*x*2 + 8)(*x* - 2) |

|  |  |  |
| --- | --- | --- |
|  | **C.** | 6*x*(*x* + 8)(*x* - 2) |

|  |  |  |
| --- | --- | --- |
|  | **D.** | 6*x*(*x* - 8)(*x* + 2) |

#### Rational Algebraic Expressions

**10.** Simplify the following expression.

|  |  |  |
| --- | --- | --- |
|  | **A.** |  |

|  |  |  |
| --- | --- | --- |
|  | **B.** |  |

|  |  |  |
| --- | --- | --- |
|  | **C.** |  |

|  |  |  |
| --- | --- | --- |
|  | **D.** |  |

#### Factor Algebraic Expressions

**11.** Factor the polynomial below.

**

(x+6)(x+4)

|  |  |
| --- | --- |
|  | **A.**  (x-6)(x-4) |

|  |  |  |
| --- | --- | --- |
|  | **B.** | (x-6)(x+4) |

|  |  |
| --- | --- |
|  | **C.** |

|  |  |
| --- | --- |
|  | **D.**  (x+6)(x-4) |

#### Factor Algebraic Expressions

**12.** Factor the following polynomial completely.



6(x+4)(x+2)

|  |  |
| --- | --- |
|  | **A.**  6(x-4)(x+2) |

|  |  |
| --- | --- |
|  | **B.**  -6(x+4)(x+2) |

|  |  |
| --- | --- |
|  | **C.** |

|  |  |
| --- | --- |
|  | **D.**  -6(x-4)(x+2) |

#### Factor Algebraic Expressions

**13.** Factor the polynomial below.

**

(x+4)(x+5)

|  |  |
| --- | --- |
|  | **A.**  (x+4)(x-5) |

|  |  |  |
| --- | --- | --- |
|  | **B.** | (x-4)(x+5) |

|  |  |
| --- | --- |
|  | **C.**  (x-4)(x-5) |

|  |  |
| --- | --- |
|  | **D.** |

#### Factor Algebraic Expressions

**14.** Factor the polynomial below.

**



|  |  |
| --- | --- |
|  | **A.** |

|  |  |  |
| --- | --- | --- |
|  | **B.** |  |

|  |  |
| --- | --- |
|  | **C.** |

|  |  |
| --- | --- |
|  | **D.** |

#### Factor Algebraic Expressions

**15.** Factor the polynomial below.

**

(x-10)(x+2)

|  |  |
| --- | --- |
|  | **A.**  (x+10)(x+2) |

|  |  |  |
| --- | --- | --- |
|  | **B.** | (x-10)(x-2) |

|  |  |
| --- | --- |
|  | **C.** |

|  |  |
| --- | --- |
|  | **D.**  Prime |
|  |  |
|  |  |

**Open Ended Questions**

**Factor the following expressions**

16.  17.  18. 

19. Jasmine is making a rectangular display for the school play. The width is 5 feet longer than the height.

**A.** Draw a diagram to depict the display & its dimensions

**B.** Write a polynomial expression, *in simplified form,* that represents the **area** of the display.

**C.** The drama teacher asked Jasmine to add a 3 feet boarder around the entire display.

Write a polynomial expression, in simplified form, that represents the **total area** of the smaller pool.

# Answers

1. A   
2. A   
3. D   
4. A   
5. B   
6. B   
7. D   
8. C   
9. C   
10. D   
11. C   
12. D   
13. B   
14. D   
15. B

# Explanations

1. First, find the greatest common factor of the two coefficients.  
  
Since the greatest common factor of 3 and 7 is 1, a coefficient other than 1 cannot be factored out of the polynomial.

Next, find the greatest common factor of the variables.  
  
The greatest common factor of *x*2 and *x* is *x*. Factor this out of the polynomial.

3*x*2 + 7*x* = ***x*(3*x* + 7)**

2. The polynomial *x*2 + b*x* + c is a perfect square trinomial if (b ÷ 2)2 is equal to c.

(4 ÷ 2)2 = 4

Therefore, the polynomial is a perfect square trinomial.  
  
The formula for the square of the binomial (*x* + *y*) is shown below.

(*x* + *y*)2 = *x*2 + 2*xy* + *y*2

In this case, *y* = 2. Use this formula to factor the polynomial.

*x*2 + 4*x* + 4 = **(*x* + 2)2**

3. First, factor the numerator.

Now, replace the numerator with the factored form and cancel out the common factors.

4. First, factor the polynomials in the numerator and the denominator.

Then, eliminate the common factors.

5. When dividing a polynomial by a monomial, factor to find common multiples and simplify.

6. First, factor the polynomials in the numerator and the denominator.

Then, eliminate the common factors.

7. First, factor the polynomials in the numerator and the denominator.

Then, eliminate common factors.

8. The polynomial shown is a difference of two squares, so it can be factored using the formula below.

*x*2 - *y*2 = (*x* + *y*)(*x* - *y*)

In this case, *y* = 6. Use the formula to factor the polynomial.

*x*2 - 36 = **(*x* + 6)(*x* - 6)**

9. First, determine what factors the elements of the polynomial have in common. In this case, each element contains multiples of 6 and *x*.  
  
Pull out the common factors.

6*x*(*x*2 + 6*x* - 16)

Finally, factor the expression in the parentheses. The factors of -16 which can be summed to 6 are 8 and -2. So, (*x*2 + 6*x* - 16) factors into

(*x* + 8)(*x* - 2).

Therefore, putting it all together, the correct factored form is

**6*x*(*x* + 8)(*x* - 2)**.

10. First, factor the numerator and the denominator.

Then, eliminate common factors.

11. First, factor the polynomials in the numerator and the denominator.

Then, eliminate the common factors.

12. First, factor out the greatest common factor of the coefficients. The greatest common factor of 0.6, -4.8, and 9 is 0.6.

0.6*x*2 - 4.8*x* + 9 = 0.6(*x*2 - 8*x* + 15)

Next, factor the resulting trinomial.

0.6(*x*2 - 8*x* + 15) = **0.6(*x* - 3)(*x* - 5)**

13. First, factor the polynomial in the denominator.

Then, eliminate common factors.

14. First, factor out a 4, and then factor using the difference of two squares.

|  |  |  |
| --- | --- | --- |
| 4*x*2 - 64 | = | 4(*x*2 - 16) |
|  | = | **4(*x* + 4)(*x* - 4)** |

15. Factor using the difference of two squares.